

## DOSIMETRY DATA

### VII. DOSIMETRY DATA

The tally multiplier (FM) feature in MCNP allows users to calculate quantities of the form:  $C \int \phi(E) R(E) dE$ , where C is a constant,  $\phi(E)$  is the fluence ( $n/cm^2$ ), and R(E) is a response function. If R(E) is a cross section, and with the appropriate choice of units for C [atom/b·cm], the quantity calculated becomes the total number of some type of reaction per unit volume. If the tally is made over a finite time interval, it becomes a reaction rate per unit volume. In addition to using the standard reaction cross-section information available in our neutron transport libraries, dosimetry or activation reaction data can also be used as a response function. Often only dosimetry data is available for rare nuclides.

A full description of the use of dosimetry data can be found in Reference 34. This memorandum also gives a listing of all reaction data that is available for each ZAID. There have been no major revisions of the LLNL/ACTL data since LLLDOS was produced. Users need to remember that dosimetry data libraries are appropriate only when used as a source of R(E) for FM tally multipliers. Dosimetry data libraries cannot be used as a source of data for materials through which actual transport is required. Table G .6 lists the available dosimetry data libraries for use with MCNP, the evaluation source and date, and the length of the data in words.

**Table G .6**  
**Dosimetry Data Libraries for MCNP Tallies**

<u>ZAID</u>	<u>AWR</u>	<u>Library</u>	<u>Source</u>	<u>Date</u>	<u>Length</u>
Z = 1 ***** Hydrogen *****					
1001.30y	1.00782	llldos	LLNL/ACTL	<1983	209
1002.30y	2.01410	llldos	LLNL/ACTL	<1983	149
1003.30y	3.01605	llldos	LLNL/ACTL	<1983	27
Z = 2 ***** Helium *****					
2003.30y	3.01603	llldos	LLNL/ACTL	<1983	267
Z = 3 ***** Lithium *****					
3006.24y	5.96340	531dos	ENDF/B-V	1978	735
3006.26y	5.96340	532dos	ENDF/B-V	1977	713
3006.30y	6.01512	llldos	LLNL/ACTL	<1983	931
3007.26y	6.95570	532dos	ENDF/B-V	1972	733
3007.30y	7.01601	llldos	LLNL/ACTL	<1983	201
Z = 4 ***** Beryllium *****					
4007.30y	7.01693	llldos	LLNL/ACTL	<1983	253
4009.30y	9.01218	llldos	LLNL/ACTL	<1983	335
Z = 5 ***** Boron *****					
5010.24y	9.92690	531dos	ENDF/B-V	1979	769
5010.26y	9.92690	532dos	ENDF/B-V	1976	589
5010.30y	10.01290	llldos	LLNL/ACTL	<1983	381
5011.30y	11.00930	llldos	LLNL/ACTL	<1983	119

**Table G .6 (Cont.)**  
**Dosimetry Data Libraries for MCNP Tallies**

<b><u>ZAID</u></b>	<b><u>AWR</u></b>	<b><u>Library</u></b>	<b><u>Source</u></b>	<b><u>Date</u></b>	<b><u>Length</u></b>
<b>Z = 6 ***** Carbon *****</b>					
6012.30y	12.00000	llldos	LLNL/ACTL	<1983	97
6013.30y	13.00340	llldos	LLNL/ACTL	<1983	479
6014.30y	14.00320	llldos	LLNL/ACTL	<1983	63
<b>Z = 7 ***** Nitrogen *****</b>					
7014.26y	13.88300	532dos	ENDF/B-V	1973	1013
7014.30y	14.00310	llldos	LLNL/ACTL	<1983	915
<b>Z = 8 ***** Oxygen *****</b>					
8016.26y	15.85800	532dos	ENDF/B-V	1973	95
8016.30y	15.99490	llldos	LLNL/ACTL	<1983	215
8017.30y	16.99910	llldos	LLNL/ACTL	<1983	239
<b>Z = 9 ***** Fluorine *****</b>					
9019.26y	18.83500	532dos	ENDF/B-V	1979	31
9019.30y	18.99840	llldos	LLNL/ACTL	<1983	517
<b>Z = 11 ***** Sodium *****</b>					
11023.30y	22.98980	llldos	LLNL/ACTL	<1983	621
<b>Z = 12 ***** Magnesium *****</b>					
12023.30y	22.99410	llldos	LLNL/ACTL	<1983	333
12024.26y	23.98500	532dos	ENDF/B-V	1979	165
12024.30y	23.98500	llldos	LLNL/ACTL	<1983	309
12025.30y	24.98580	llldos	LLNL/ACTL	<1983	309
12026.30y	25.98260	llldos	LLNL/ACTL	<1983	321
12027.30y	26.98430	llldos	LLNL/ACTL	<1983	309
<b>Z = 13 ***** Aluminum *****</b>					
13026.30y	25.98690	llldos	LLNL/ACTL	<1983	447
13027.24y	26.75000	531dos	ENDF/B-V	1973	1165
13027.26y	26.75000	532dos	ENDF/B-V	1973	1753
13027.30y	26.98150	llldos	LLNL/ACTL	<1983	491
<b>Z = 14 ***** Silicon *****</b>					
14027.30y	26.98670	llldos	LLNL/ACTL	<1983	401
14028.30y	27.97690	llldos	LLNL/ACTL	<1983	377
14029.30y	28.97650	llldos	LLNL/ACTL	<1983	389
14030.30y	29.97380	llldos	LLNL/ACTL	<1983	395
14031.30y	30.97540	llldos	LLNL/ACTL	<1983	337

**DOSIMETRY DATA**

**Table G .6 (Cont.)**  
**Dosimetry Data Libraries for MCNP Tallies**

<b><u>ZAID</u></b>	<b><u>AWR</u></b>	<b><u>Library</u></b>	<b><u>Source</u></b>	<b><u>Date</u></b>	<b><u>Length</u></b>
Z = 15 ***** Phosphorus *****					
15031.26y	30.70800	532dos	ENDF/B-V	1977	65
15031.30y	30.97380	llldos	LLNL/ACTL	<1983	263
Z = 16 ***** Sulfur *****					
16031.30y	30.97960	llldos	LLNL/ACTL	<1983	393
16032.24y	31.69740	531dos	ENDF/B-V	1979	145
16032.26y	31.69700	532dos	ENDF/B-V	1977	35
16032.30y	31.97210	llldos	LLNL/ACTL	<1983	417
16033.30y	32.97150	llldos	LLNL/ACTL	<1983	435
16034.30y	33.96790	llldos	LLNL/ACTL	<1983	437
16035.30y	34.96900	llldos	LLNL/ACTL	<1983	339
16036.30y	35.96710	llldos	LLNL/ACTL	<1983	293
16037.30y	36.97110	llldos	LLNL/ACTL	<1983	279
Z = 17 ***** Chlorine *****					
17034.30y	33.97380	llldos	LLNL/ACTL	<1983	401
17035.30y	34.96890	llldos	LLNL/ACTL	<1983	459
17036.30y	35.96830	llldos	LLNL/ACTL	<1983	563
17037.30y	36.96590	llldos	LLNL/ACTL	<1983	407
7038.30y	37.96800	llldos	LLNL/ACTL	<1983	33
Z = 18 ***** Argon *****					
18036.30y	35.96750	llldos	LLNL/ACTL	<1983	309
18037.30y	36.96680	llldos	LLNL/ACTL	<1983	311
18038.30y	37.96270	llldos	LLNL/ACTL	<1983	311
18039.30y	38.96430	llldos	LLNL/ACTL	<1983	337
18040.26y	39.61910	532dos	ENDF/B-V	1979	3861
18040.30y	39.96240	llldos	LLNL/ACTL	<1983	347
18041.30y	40.96450	llldos	LLNL/ACTL	<1983	317
18042.30y	41.96300	llldos	LLNL/ACTL	<1983	291
18043.30y	42.96570	llldos	LLNL/ACTL	<1983	295
Z = 19 ***** Potassium *****					
19038.30y	37.96910	llldos	LLNL/ACTL	<1983	603
19039.30y	38.96370	llldos	LLNL/ACTL	<1983	405
19040.30y	39.96400	llldos	LLNL/ACTL	<1983	675
19041.26y	40.60990	532dos	ENDF/B-V	1979	33
19041.30y	40.96180	llldos	LLNL/ACTL	<1983	369
19042.30y	41.96240	llldos	LLNL/ACTL	<1983	343
19043.30y	42.96070	llldos	LLNL/ACTL	<1983	277
19044.30y	43.96160	llldos	LLNL/ACTL	<1983	275
19045.30y	44.96070	llldos	LLNL/ACTL	<1983	283
19046.30y	45.96200	llldos	LLNL/ACTL	<1983	283

**Table G .6 (Cont.)**  
**Dosimetry Data Libraries for MCNP Tallies**

<b><u>ZAID</u></b>	<b><u>AWR</u></b>	<b><u>Library</u></b>	<b><u>Source</u></b>	<b><u>Date</u></b>	<b><u>Length</u></b>
<b>Z = 20 ***** Calcium *****</b>					
20039.30y	38.97070	l1ldos	LLNL/ACTL	<1983	601
20040.30y	39.96260	l1ldos	LLNL/ACTL	<1983	309
20041.30y	40.96230	l1ldos	LLNL/ACTL	<1983	313
20042.30y	41.95860	l1ldos	LLNL/ACTL	<1983	285
20043.30y	42.95880	l1ldos	LLNL/ACTL	<1983	295
20044.30y	43.95550	l1ldos	LLNL/ACTL	<1983	269
20045.30y	44.95620	l1ldos	LLNL/ACTL	<1983	271
20046.30y	45.95370	l1ldos	LLNL/ACTL	<1983	255
20047.30y	46.95450	l1ldos	LLNL/ACTL	<1983	243
20048.30y	47.95250	l1ldos	LLNL/ACTL	<1983	239
20049.30y	48.95570	l1ldos	LLNL/ACTL	<1983	229
<b>Z = 21 ***** Scandium *****</b>					
21044.30y	43.95940	l1ldos	LLNL/ACTL	<1983	313
21044.31y	43.95940	l1ldos	LLNL/ACTL	<1983	311
21045.24y	44.56790	531dos	ENDF/B-V	1979	20179
21045.26y	44.56790	532dos	ENDF/B-V	1979	20211
21045.30y	44.95590	l1ldos	LLNL/ACTL	<1983	547
21046.30y	45.95520	l1ldos	LLNL/ACTL	<1983	323
21046.31y	45.95520	l1ldos	LLNL/ACTL	<1983	323
21047.30y	46.95240	l1ldos	LLNL/ACTL	<1983	331
21048.30y	47.95220	l1ldos	LLNL/ACTL	<1983	325
<b>Z = 22 ***** Titanium *****</b>					
22045.30y	44.95810	l1ldos	LLNL/ACTL	<1983	449
22046.24y	45.55780	531dos	ENDF/B-V	1977	53
22046.26y	45.55780	532dos	ENDF/B-V	1977	53
22046.30y	45.95260	l1ldos	LLNL/ACTL	<1983	391
22047.24y	46.54800	531dos	ENDF/B-V	1977	209
22047.26y	46.54800	532dos	ENDF/B-V	1977	209
22047.30y	46.95180	l1ldos	LLNL/ACTL	<1983	419
22048.24y	47.53600	531dos	ENDF/B-V	1977	145
22048.26y	47.53600	532dos	ENDF/B-V	1977	177
22048.30y	47.94790	l1ldos	LLNL/ACTL	<1983	415
22049.30y	48.94790	l1ldos	LLNL/ACTL	<1983	409
22050.26y	49.57000	532dos	ENDF/B-V	1979	33
22050.30y	49.94480	l1ldos	LLNL/ACTL	<1983	345
22051.30y	50.94660	l1ldos	LLNL/ACTL	<1983	389
<b>Z = 23 ***** Vanadium *****</b>					
23047.30y	46.95490	l1ldos	LLNL/ACTL	<1983	209
23048.30y	47.95230	l1ldos	LLNL/ACTL	<1983	399
23049.30y	48.94850	l1ldos	LLNL/ACTL	<1983	423
23050.30y	49.94720	l1ldos	LLNL/ACTL	<1983	407
23051.30y	50.94400	l1ldos	LLNL/ACTL	<1983	357
23052.30y	51.94480	l1ldos	LLNL/ACTL	<1983	401

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**Table G .6 (Cont.)**  
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<b><u>ZAID</u></b>	<b><u>AWR</u></b>	<b><u>Library</u></b>	<b><u>Source</u></b>	<b><u>Date</u></b>	<b><u>Length</u></b>
Z = 24 ***** Chromium *****					
24049.30y	48.95130	llldos	LLNL/ACTL	<1983	377
24050.26y	49.51650	532dos	ENDF/B-V	1979	7405
24050.30y	49.94600	llldos	LLNL/ACTL	<1983	435
24051.30y	50.94480	llldos	LLNL/ACTL	<1983	377
24052.26y	51.49380	532dos	ENDF/B-V	1979	27
24052.30y	51.94050	llldos	LLNL/ACTL	<1983	417
24053.30y	52.94060	llldos	LLNL/ACTL	<1983	425
24054.30y	53.93890	llldos	LLNL/ACTL	<1983	461
24055.30y	54.94080	llldos	LLNL/ACTL	<1983	419
24056.30y	55.94070	llldos	LLNL/ACTL	<1983	297
Z = 25 ***** Manganese *****					
25051.30y	50.94820	llldos	LLNL/ACTL	<1983	417
25052.30y	51.94560	llldos	LLNL/ACTL	<1983	379
25053.30y	52.94130	llldos	LLNL/ACTL	<1983	425
25054.30y	53.94040	llldos	LLNL/ACTL	<1983	391
25055.24y	54.46610	531dos	ENDF/B-V	1977	119
25055.30y	54.93800	llldos	LLNL/ACTL	<1983	435
25056.30y	55.93890	llldos	LLNL/ACTL	<1983	423
25057.30y	56.93830	llldos	LLNL/ACTL	<1983	419
25058.30y	57.93970	llldos	LLNL/ACTL	<1983	285
Z = 26 ***** Iron *****					
26053.30y	52.94530	llldos	LLNL/ACTL	<1983	387
26054.24y	53.47620	531dos	ENDF/B-V	1979	517
26054.26y	53.47600	532dos	ENDF/B-V	1978	21563
26054.30y	53.93960	llldos	LLNL/ACTL	<1983	457
26055.30y	54.93830	llldos	LLNL/ACTL	<1983	373
26056.24y	55.45400	531dos	ENDF/B-V	1978	449
26056.26y	55.45400	532dos	ENDF/B-V	1978	581
26056.30y	55.93490	llldos	LLNL/ACTL	<1983	415
26057.30y	56.93540	llldos	LLNL/ACTL	<1983	447
26058.24y	57.43560	531dos	ENDF/B-V	1979	7077
26058.26y	57.43560	532dos	ENDF/B-V	1979	7097
26058.30y	57.93330	llldos	LLNL/ACTL	<1983	431
26059.30y	58.93490	llldos	LLNL/ACTL	<1983	397
26060.30y	59.93400	llldos	LLNL/ACTL	<1983	285
Z = 27 ***** Cobalt *****					
27057.30y	56.93630	llldos	LLNL/ACTL	<1983	629
27058.30y	57.93580	llldos	LLNL/ACTL	<1983	531
27058.31y	57.93580	llldos	LLNL/ACTL	<1983	569
27059.30y	58.93320	llldos	LLNL/ACTL	<1983	657
27060.30y	59.93380	llldos	LLNL/ACTL	<1983	435
27060.31y	59.93380	llldos	LLNL/ACTL	<1983	499
27061.30y	60.93250	llldos	LLNL/ACTL	<1983	613
27062.30y	61.93400	llldos	LLNL/ACTL	<1983	463
27062.31y	61.93400	llldos	LLNL/ACTL	<1983	519
27063.30y	62.93360	llldos	LLNL/ACTL	<1983	339

**Table G .6 (Cont.)**  
**Dosimetry Data Libraries for MCNP Tallies**

<b>ZAID</b>	<b>AWR</b>	<b>Library</b>	<b>Source</b>	<b>Date</b>	<b>Length</b>
27064.30y	63.93580	llldos	LLNL/ACTL	<1983	323
<b>Z = 28 ***** Nickel *****</b>					
28057.30y	56.93980	llldos	LLNL/ACTL	<1983	441
28058.24y	57.43760	531dos	ENDF/B-V	1977	411
28058.26y	57.43760	532dos	ENDF/B-V	1978	4079
28058.30y	57.93530	llldos	LLNL/ACTL	<1983	509
28059.30y	58.93430	llldos	LLNL/ACTL	<1983	513
28060.24y	59.41590	531dos	ENDF/B-V	1977	435
28060.26y	59.41590	532dos	ENDF/B-V	1978	479
28060.30y	59.93080	llldos	LLNL/ACTL	<1983	503
28061.30y	60.93110	llldos	LLNL/ACTL	<1983	489
28062.26y	61.39630	532dos	ENDF/B-V	1978	3847
8062.30y	61.92830	llldos	LLNL/ACTL	<1983	459
28063.30y	62.92970	llldos	LLNL/ACTL	<1983	375
28064.30y	63.92800	llldos	LLNL/ACTL	<1983	397
28065.30y	64.93010	llldos	LLNL/ACTL	<1983	345
<b>Z = 29 ***** Copper *****</b>					
29062.30y	61.93260	llldos	LLNL/ACTL	<1983	507
29063.24y	62.93000	531dos	ENDF/B-V	1978	3375
29063.26y	62.93000	532dos	ENDF/B-V	1978	3615
29063.30y	62.92960	llldos	LLNL/ACTL	<1983	513
29064.30y	63.92980	llldos	LLNL/ACTL	<1983	437
29065.24y	64.92800	531dos	ENDF/B-V	1978	49
29065.26y	64.92800	532dos	ENDF/B-V	1978	49
29065.30y	64.92780	llldos	LLNL/ACTL	<1983	563
29066.30y	65.92890	llldos	LLNL/ACTL	<1983	397
<b>Z = 30 ***** Zinc *****</b>					
30064.30y	63.92910	llldos	LLNL/ACTL	<1983	555
30066.30y	65.92600	llldos	LLNL/ACTL	<1983	561
30067.30y	66.92710	llldos	LLNL/ACTL	<1983	411
30068.30y	67.92480	llldos	LLNL/ACTL	<1983	643
30070.30y	69.92530	llldos	LLNL/ACTL	<1983	619
<b>Z = 31 ***** Gallium *****</b>					
31069.30y	68.92560	llldos	LLNL/ACTL	<1983	197
31071.30y	70.92470	llldos	LLNL/ACTL	<1983	419
<b>Z = 32 ***** Germanium *****</b>					
32070.30y	69.92420	llldos	LLNL/ACTL	<1983	405
32072.30y	71.92210	llldos	LLNL/ACTL	<1983	423
32073.30y	72.92350	llldos	LLNL/ACTL	<1983	431
32074.30y	73.92120	llldos	LLNL/ACTL	<1983	629
32076.30y	75.92140	llldos	LLNL/ACTL	<1983	623

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**Table G .6 (Cont.)**  
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<b><u>ZAID</u></b>	<b><u>AWR</u></b>	<b><u>Library</u></b>	<b><u>Source</u></b>	<b><u>Date</u></b>	<b><u>Length</u></b>
Z = 33 ***** Arsenic *****					
33075.30y	74.92160	llldos	LLNL/ACTL	<1983	987
Z = 34 ***** Selenium *****					
34074.30y	73.92250	llldos	LLNL/ACTL	<1983	159
34076.30y	75.91920	llldos	LLNL/ACTL	<1983	177
34080.30y	79.91650	llldos	LLNL/ACTL	<1983	205
34082.30y	81.91670	llldos	LLNL/ACTL	<1983	223
Z = 35 ***** Bromine *****					
35079.30y	78.91830	llldos	LLNL/ACTL	<1983	263
35081.30y	80.91630	llldos	LLNL/ACTL	<1983	695
Z = 37 ***** Rubidium *****					
37085.30y	84.91180	llldos	LLNL/ACTL	<1983	193
37087.30y	86.90920	llldos	LLNL/ACTL	<1983	199
Z = 38 ***** Strontium *****					
38084.30y	83.91340	llldos	LLNL/ACTL	<1983	163
38086.30y	85.90930	llldos	LLNL/ACTL	<1983	33
Z = 39 ***** Yttrium *****					
39089.30y	88.90590	llldos	LLNL/ACTL	<1983	419
Z = 40 ***** Zirconium *****					
40089.30y	88.90890	llldos	LLNL/ACTL	<1983	321
40090.26y	89.13200	532dos	ENDF/B-V	1976	37
40090.30y	89.90470	llldos	LLNL/ACTL	<1983	385
40091.30y	90.90560	llldos	LLNL/ACTL	<1983	407
40092.26y	91.11200	532dos	ENDF/B-V	1976	3821
40092.30y	91.90500	llldos	LLNL/ACTL	<1983	431
40093.30y	92.90650	llldos	LLNL/ACTL	<1983	371
40094.26y	93.09600	532dos	ENDF/B-V	1976	5255
40094.30y	93.90630	llldos	LLNL/ACTL	<1983	417
40095.30y	94.90800	llldos	LLNL/ACTL	<1983	375
40096.30y	95.90830	llldos	LLNL/ACTL	<1983	57
40097.30y	96.91090	llldos	LLNL/ACTL	<1983	339
Z = 41 ***** Niobium *****					
41091.30y	90.90700	llldos	LLNL/ACTL	<1983	491
41091.31y	90.90700	llldos	LLNL/ACTL	<1983	491
41092.30y	91.90720	llldos	LLNL/ACTL	<1983	285
41092.31y	91.90720	llldos	LLNL/ACTL	<1983	285
41093.30y	92.90640	llldos	LLNL/ACTL	<1983	493
41094.30y	93.90730	llldos	LLNL/ACTL	<1983	331
41095.30y	94.90680	llldos	LLNL/ACTL	<1983	333

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41096.30y	95.90810	llldos	LLNL/ACTL	<1983	335
41097.30y	96.90810	llldos	LLNL/ACTL	<1983	339
41098.30y	97.91030	llldos	LLNL/ACTL	<1983	341
41100.30y	99.91420	llldos	LLNL/ACTL	<1983	349
<b>Z = 42 ***** Molybdenum *****</b>					
42090.30y	89.91390	llldos	LLNL/ACTL	<1983	261
42091.30y	90.91180	llldos	LLNL/ACTL	<1983	281
42092.26y	91.21000	532dos	ENDF/B-V	1980	7815
42092.30y	91.90680	llldos	LLNL/ACTL	<1983	537
42093.30y	92.90680	llldos	LLNL/ACTL	<1983	429
42093.31y	92.90680	llldos	LLNL/ACTL	<1983	461
42094.30y	93.90510	llldos	LLNL/ACTL	<1983	443
42095.30y	94.90580	llldos	LLNL/ACTL	<1983	523
42096.30y	95.90470	llldos	LLNL/ACTL	<1983	501
42097.30y	96.90600	llldos	LLNL/ACTL	<1983	427
42098.26y	97.06440	532dos	ENDF/B-V	1980	6489
42098.30y	97.90540	llldos	LLNL/ACTL	<1983	421
42099.30y	98.90770	llldos	LLNL/ACTL	<1983	445
42100.26y	99.04920	532dos	ENDF/B-V	1980	4971
42100.30y	99.90750	llldos	LLNL/ACTL	<1983	427
42101.30y	100.91000	llldos	LLNL/ACTL	<1983	447
<b>Z = 43 ***** Technetium *****</b>					
43099.30y	98.90620	llldos	LLNL/ACTL	<1983	469
43099.31y	98.90620	llldos	LLNL/ACTL	<1983	469
<b>Z = 45 ***** Rhodium *****</b>					
45103.30y	102.90600	llldos	LLNL/ACTL	<1983	275
<b>Z = 46 ***** Palladium *****</b>					
46110.30y	109.90500	llldos	LLNL/ACTL	<1983	417
<b>Z = 47 ***** Silver *****</b>					
47106.30y	105.90700	llldos	LLNL/ACTL	<1983	263
47106.31y	105.90700	llldos	LLNL/ACTL	<1983	265
47107.30y	106.90500	llldos	LLNL/ACTL	<1983	517
47108.30y	107.90600	llldos	LLNL/ACTL	<1983	275
47108.31y	107.90600	llldos	LLNL/ACTL	<1983	275
47109.30y	108.90500	llldos	LLNL/ACTL	<1983	583
47110.30y	109.90600	llldos	LLNL/ACTL	<1983	277
47110.31y	109.90600	llldos	LLNL/ACTL	<1983	281
<b>Z = 48 ***** Cadmium *****</b>					
48106.30y	105.90600	llldos	LLNL/ACTL	<1983	177
48111.30y	110.90400	llldos	LLNL/ACTL	<1983	317
48112.30y	111.90300	llldos	LLNL/ACTL	<1983	221
48116.30y	115.90500	llldos	LLNL/ACTL	<1983	231

**DOSIMETRY DATA**

**Table G .6 (Cont.)**  
**Dosimetry Data Libraries for MCNP Tallies**

<b><u>ZAID</u></b>	<b><u>AWR</u></b>	<b><u>Library</u></b>	<b><u>Source</u></b>	<b><u>Date</u></b>	<b><u>Length</u></b>
Z = 49 ***** Indium *****					
49113.30y	112.90400	llldos	LLNL/ACTL	<1983	861
49115.24y	113.92000	531dos	ENDF/B-V	1978	26009
49115.26y	113.92000	532dos	ENDF/B-V	1978	26009
49115.30y	114.90400	llldos	LLNL/ACTL	<1983	1265
Z = 50 ***** Tin *****					
50112.30y	111.90500	llldos	LLNL/ACTL	<1983	789
50114.30y	113.90300	llldos	LLNL/ACTL	<1983	435
50115.30y	114.90300	llldos	LLNL/ACTL	<1983	389
50116.30y	115.90200	llldos	LLNL/ACTL	<1983	603
50117.30y	116.90300	llldos	LLNL/ACTL	<1983	313
50118.30y	117.90200	llldos	LLNL/ACTL	<1983	745
50119.30y	118.90300	llldos	LLNL/ACTL	<1983	311
50120.26y	118.87200	532dos	ENDF/B-V	1974	12881
50120.30y	119.90200	llldos	LLNL/ACTL	<1983	309
50122.26y	120.85600	532dos	ENDF/B-V	1974	1891
50122.30y	121.90300	llldos	LLNL/ACTL	<1983	275
50124.26y	122.84100	532dos	ENDF/B-V	1974	1693
50124.30y	123.90500	llldos	LLNL/ACTL	<1983	485
Z = 51 ***** Antimony *****					
51121.30y	120.90400	llldos	LLNL/ACTL	<1983	811
51123.30y	122.90400	llldos	LLNL/ACTL	<1983	1013
Z = 53 ***** Iodine *****					
53127.24y	125.81400	531dos	ENDF/B-V	1972	115
53127.26y	125.81400	532dos	ENDF/B-V	1980	14145
53127.30y	126.90400	llldos	LLNL/ACTL	<1983	221
Z = 55 ***** Cesium *****					
55133.30y	132.90500	llldos	LLNL/ACTL	<1983	215
Z = 57 ***** Lanthanum *****					
57139.26y	137.71300	532dos	ENDF/B-V	1980	15475
Z = 58 ***** Cerium *****					
58140.30y	139.90500	llldos	LLNL/ACTL	<1983	427
58142.30y	141.90900	llldos	LLNL/ACTL	<1983	265
Z = 59 ***** Praseodymium *****					
59141.30y	140.90800	llldos	LLNL/ACTL	<1983	215

**Table G .6 (Cont.)**  
**Dosimetry Data Libraries for MCNP Tallies**

<b><u>ZAID</u></b>	<b><u>AWR</u></b>	<b><u>Library</u></b>	<b><u>Source</u></b>	<b><u>Date</u></b>	<b><u>Length</u></b>
<b>Z = 60 ***** Neodymium *****</b>					
60142.30y	141.90800	llldos	LLNL/ACTL	<1983	207
60148.30y	147.91700	llldos	LLNL/ACTL	<1983	255
60150.30y	149.92100	llldos	LLNL/ACTL	<1983	259
<b>Z = 62 ***** Samarium *****</b>					
62144.30y	143.91200	llldos	LLNL/ACTL	<1983	189
62148.30y	147.91500	llldos	LLNL/ACTL	<1983	245
62152.30y	151.92000	llldos	LLNL/ACTL	<1983	237
62154.30y	153.92200	llldos	LLNL/ACTL	<1983	247
<b>Z = 63 ***** Europium *****</b>					
63151.30y	150.92000	llldos	LLNL/ACTL	<1983	731
63153.30y	152.92100	llldos	LLNL/ACTL	<1983	565
<b>Z = 64 ***** Gadolinium *****</b>					
64150.30y	149.91900	llldos	LLNL/ACTL	<1983	237
64151.30y	150.92000	llldos	LLNL/ACTL	<1983	241
<b>Z = 66 ***** Dysprosium *****</b>					
66164.26y	162.52000	532dos	ENDF/B-V	1967	581
<b>Z = 67 ***** Holmium *****</b>					
67163.30y	162.92900	llldos	LLNL/ACTL	<1983	533
67164.30y	163.93000	llldos	LLNL/ACTL	<1983	327
67164.31y	163.93000	llldos	LLNL/ACTL	<1983	327
67165.30y	164.93000	llldos	LLNL/ACTL	<1983	589
67166.30y	165.93200	llldos	LLNL/ACTL	<1983	333
67166.31y	165.93200	llldos	LLNL/ACTL	<1983	333
<b>Z = 69 ***** Thulium *****</b>					
69169.30y	168.93400	llldos	LLNL/ACTL	<1983	453
<b>Z = 71 ***** Lutetium *****</b>					
71173.30y	172.93900	llldos	LLNL/ACTL	<1983	587
71174.30y	173.94000	llldos	LLNL/ACTL	<1983	417
71174.31y	173.94000	llldos	LLNL/ACTL	<1983	465
71175.30y	174.94100	llldos	LLNL/ACTL	<1983	559
71176.30y	175.94300	llldos	LLNL/ACTL	<1983	621
71176.31y	175.94300	llldos	LLNL/ACTL	<1983	637
71177.30y	176.94400	llldos	LLNL/ACTL	<1983	573
71177.31y	176.94400	llldos	LLNL/ACTL	<1983	573

**DOSIMETRY DATA**

**Table G .6 (Cont.)**  
**Dosimetry Data Libraries for MCNP Tallies**

<b>ZAID</b>	<b>AWR</b>	<b>Library</b>	<b>Source</b>	<b>Date</b>	<b>Length</b>
Z = 72 ***** Hafnium *****					
72174.30y	173.94000	llldos	LLNL/ACTL	<1983	147
72175.30y	174.94100	llldos	LLNL/ACTL	<1983	121
72176.30y	175.94100	llldos	LLNL/ACTL	<1983	153
72177.30y	176.94300	llldos	LLNL/ACTL	<1983	157
72178.30y	177.94400	llldos	LLNL/ACTL	<1983	153
72179.30y	178.94600	llldos	LLNL/ACTL	<1983	433
72180.30y	179.94700	llldos	LLNL/ACTL	<1983	409
72181.30y	180.94900	llldos	LLNL/ACTL	<1983	365
72183.30y	182.95400	llldos	LLNL/ACTL	<1983	373
Z = 73 ***** Tantalum *****					
73179.30y	178.94600	llldos	LLNL/ACTL	<1983	629
73180.30y	179.94700	llldos	LLNL/ACTL	<1983	523
73180.31y	179.94700	llldos	LLNL/ACTL	<1983	435
73181.30y	180.94800	llldos	LLNL/ACTL	<1983	715
73182.30y	181.95000	llldos	LLNL/ACTL	<1983	435
73182.31y	181.95000	llldos	LLNL/ACTL	<1983	447
73183.30y	182.95100	llldos	LLNL/ACTL	<1983	425
73184.30y	183.95400	llldos	LLNL/ACTL	<1983	371
73186.30y	185.95900	llldos	LLNL/ACTL	<1983	377
Z = 74 ***** Tungsten *****					
74179.30y	178.94700	llldos	LLNL/ACTL	<1983	263
74180.30y	179.94700	llldos	LLNL/ACTL	<1983	397
74181.30y	180.94800	llldos	LLNL/ACTL	<1983	263
74182.30y	181.94800	llldos	LLNL/ACTL	<1983	415
74183.30y	182.95000	llldos	LLNL/ACTL	<1983	499
74184.30y	183.95100	llldos	LLNL/ACTL	<1983	443
74185.30y	184.95300	llldos	LLNL/ACTL	<1983	267
74186.30y	185.95400	llldos	LLNL/ACTL	<1983	413
74187.30y	186.95700	llldos	LLNL/ACTL	<1983	279
74188.30y	187.95800	llldos	LLNL/ACTL	<1983	271
Z = 75 ***** Rhenium *****					
75184.30y	183.95300	llldos	LLNL/ACTL	<1983	331
75184.31y	183.95300	llldos	LLNL/ACTL	<1983	335
75185.30y	184.95300	llldos	LLNL/ACTL	<1983	373
75186.30y	185.95500	llldos	LLNL/ACTL	<1983	381
75187.30y	186.95600	llldos	LLNL/ACTL	<1983	547
75188.30y	187.95800	llldos	LLNL/ACTL	<1983	339
75188.31y	187.95800	llldos	LLNL/ACTL	<1983	341
Z = 77 ***** Iridium *****					
77191.30y	190.96100	llldos	LLNL/ACTL	<1983	237
77193.30y	192.96300	llldos	LLNL/ACTL	<1983	243
77194.30y	193.96500	llldos	LLNL/ACTL	<1983	421

**Table G .6 (Cont.)**  
**Dosimetry Data Libraries for MCNP Tallies**

<u>ZAID</u>	<u>AWR</u>	<u>Library</u>	<u>Source</u>	<u>Date</u>	<u>Length</u>
<b>Z = 78 ***** Platinum *****</b>					
78190.30y	189.96000	llldos	LLNL/ACTL	<1983	151
78192.30y	191.96100	llldos	LLNL/ACTL	<1983	153
78193.30y	192.96300	llldos	LLNL/ACTL	<1983	123
78193.31y	192.96300	llldos	LLNL/ACTL	<1983	123
78194.30y	193.96300	llldos	LLNL/ACTL	<1983	211
78195.30y	194.96500	llldos	LLNL/ACTL	<1983	157
78196.30y	195.96500	llldos	LLNL/ACTL	<1983	157
78197.30y	196.96700	llldos	LLNL/ACTL	<1983	427
78197.31y	196.96700	llldos	LLNL/ACTL	<1983	129
78198.30y	197.96800	llldos	LLNL/ACTL	<1983	183
78199.30y	198.97100	llldos	LLNL/ACTL	<1983	99
78199.31y	198.97100	llldos	LLNL/ACTL	<1983	99
<b>Z = 79 ***** Gold *****</b>					
79193.30y	192.96400	llldos	LLNL/ACTL	<1983	209
79194.30y	193.96500	llldos	LLNL/ACTL	<1983	261
79195.30y	194.96500	llldos	LLNL/ACTL	<1983	261
79196.30y	195.96700	llldos	LLNL/ACTL	<1983	265
79196.31y	195.96700	llldos	LLNL/ACTL	<1983	265
79197.30y	196.96700	llldos	LLNL/ACTL	<1983	307
79198.30y	197.96800	llldos	LLNL/ACTL	<1983	265
79199.30y	198.96900	llldos	LLNL/ACTL	<1983	269
79200.30y	199.97100	llldos	LLNL/ACTL	<1983	39
<b>Z = 80 ***** Mercury *****</b>					
80202.30y	201.97100	llldos	LLNL/ACTL	<1983	381
80203.30y	202.97300	llldos	LLNL/ACTL	<1983	379
80204.30y	203.97300	llldos	LLNL/ACTL	<1983	365
<b>Z = 81 ***** Thallium *****</b>					
81202.30y	201.97200	llldos	LLNL/ACTL	<1983	377
81203.30y	202.97200	llldos	LLNL/ACTL	<1983	375
81204.30y	203.97400	llldos	LLNL/ACTL	<1983	373
81205.30y	204.97400	llldos	LLNL/ACTL	<1983	369
<b>Z = 82 ***** Lead *****</b>					
82203.30y	202.97300	llldos	LLNL/ACTL	<1983	257
82204.30y	203.97300	llldos	LLNL/ACTL	<1983	405
82205.30y	204.97400	llldos	LLNL/ACTL	<1983	257
82206.30y	205.97400	llldos	LLNL/ACTL	<1983	347
82207.30y	206.97600	llldos	LLNL/ACTL	<1983	333
82208.30y	207.97700	llldos	LLNL/ACTL	<1983	263
82209.30y	208.98100	llldos	LLNL/ACTL	<1983	279
82210.30y	209.98400	llldos	LLNL/ACTL	<1983	351

**DOSIMETRY DATA**

**Table G .6 (Cont.)**  
**Dosimetry Data Libraries for MCNP Tallies**

<b><u>ZAID</u></b>	<b><u>AWR</u></b>	<b><u>Library</u></b>	<b><u>Source</u></b>	<b><u>Date</u></b>	<b><u>Length</u></b>
Z = 83 ***** Bismuth *****					
83208.30y	207.98000	llldos	LLNL/ACTL	<1983	409
83209.30y	208.98000	llldos	LLNL/ACTL	<1983	551
83210.30y	209.98400	llldos	LLNL/ACTL	<1983	421
83210.31y	209.98400	llldos	LLNL/ACTL	<1983	421
Z = 84 ***** Polonium *****					
84210.30y	209.98300	llldos	LLNL/ACTL	<1983	441
Z = 90 ***** Thorium *****					
90230.30y	230.03300	llldos	LLNL/ACTL	<1983	209
90231.30y	231.03600	llldos	LLNL/ACTL	<1983	599
90232.30y	232.03800	llldos	LLNL/ACTL	<1983	347
90233.30y	233.04200	llldos	LLNL/ACTL	<1983	561
90234.30y	234.04400	llldos	LLNL/ACTL	<1983	37
Z = 91 ***** Protactinium *****					
91231.26y	229.05000	532dos	ENDF/B-V	1978	2861
91233.26y	231.03800	532dos	ENDF/B-V	1978	73
91233.30y	233.04000	llldos	LLNL/ACTL	<1983	361
Z = 92 ***** Uranium *****					
92233.26y	231.04300	532dos	ENDF/B-V	1978	75
92233.30y	233.04000	llldos	LLNL/ACTL	<1983	461
92234.30y	234.04100	llldos	LLNL/ACTL	<1983	393
92235.30y	235.04400	llldos	LLNL/ACTL	<1983	4629
92236.30y	236.04600	llldos	LLNL/ACTL	<1983	395
92237.30y	237.04900	llldos	LLNL/ACTL	<1983	609
92238.30y	238.05100	llldos	LLNL/ACTL	<1983	3103
92239.30y	239.05400	llldos	LLNL/ACTL	<1983	825
92240.30y	240.05700	llldos	LLNL/ACTL	<1983	389
Z = 93 ***** Neptunium *****					
93237.30y	237.04800	llldos	LLNL/ACTL	<1983	629
Z = 94 ***** Plutonium *****					
94237.30y	237.04800	llldos	LLNL/ACTL	<1983	487
94238.30y	238.05000	llldos	LLNL/ACTL	<1983	459
94239.30y	239.05200	llldos	LLNL/ACTL	<1983	497
94240.30y	240.05400	llldos	LLNL/ACTL	<1983	479
94241.30y	241.05700	llldos	LLNL/ACTL	<1983	559
94242.30y	242.05900	llldos	LLNL/ACTL	<1983	505
94243.30y	243.06200	llldos	LLNL/ACTL	<1983	511

**Table G .6 (Cont.)**  
**Dosimetry Data Libraries for MCNP Tallies**

<b><u>ZAID</u></b>	<b><u>AWR</u></b>	<b><u>Library</u></b>	<b><u>Source</u></b>	<b><u>Date</u></b>	<b><u>Length</u></b>
<b>Z = 95 ***** Americium *****</b>					
95241.30y	241.05700	llldos	LLNL/ACTL	<1983	673
95242.30y	242.06000	llldos	LLNL/ACTL	<1983	473
95243.30y	243.06100	llldos	LLNL/ACTL	<1983	431
<b>Z = 96 ***** Curium *****</b>					
96242.30y	242.05900	llldos	LLNL/ACTL	<1983	467
96243.30y	243.06100	llldos	LLNL/ACTL	<1983	465
96244.30y	244.06300	llldos	LLNL/ACTL	<1983	483
96245.30y	245.06500	llldos	LLNL/ACTL	<1983	465
96246.30y	246.06700	llldos	LLNL/ACTL	<1983	491
96247.30y	247.07000	llldos	LLNL/ACTL	<1983	491
96248.30y	248.07200	llldos	LLNL/ACTL	<1983	495
<b>Z = 97 ***** Berkelium *****</b>					
97249.30y	249.07500	llldos	LLNL/ACTL	<1983	545
<b>Z = 98 ***** Californium *****</b>					
98249.30y	249.07500	llldos	LLNL/ACTL	<1983	491
98250.30y	250.07600	llldos	LLNL/ACTL	<1983	335
98251.30y	251.08000	llldos	LLNL/ACTL	<1983	485
98252.30y	252.08200	llldos	LLNL/ACTL	<1983	467

**DOSIMETRY DATA**